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10/732,966	12/10/2003	Hung Chih Chen	8402 USA/AGS/LAP	9309

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EXAMINER	
MACARTHUR, SYLVIA	
ART UNIT	**PAPER NUMBER**
1763	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/732,966	CHEN ET AL.	
	Examiner	Art Unit	
	Sylvia R. MacArthur	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 March 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5 and 7-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5 and 7-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 October 2004* is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *3/1/2007*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-5 and 7-21 have been considered but are moot in view of the new ground(s) of rejection based on the prior art recited in the IDS filed 3/1/2007, Fig. 3B of Chen et al (US 2005/0113002) illustrates the claimed invention as recited in the independent claims 1, 19 and 20 and Fig.8 of Glashauser (US 6,419,567)

The examiner has withdrawn the 102 rejection basis Hiroshi (JP 0-11055) as applicant's arguments on page 7, paragraph 3 that the guide ring of Hiroshi fails to teach the curved section as recited in claims 1, 19, and 20. The examiner has also withdrawn the rejection of Kajiwara et al (WO 02/098608) as the prior art fails to the vertical side walls as argued by applicant on page 9.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-5, 7,8, 13, and 18-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Chen et al (US 2005/0113002).

Regarding claims 1 and 19: Chen et al teaches a retaining ring (300) comprising: a generally annular body having a top surface, a bottom surface, an inner diameter surface, and an outer diameter surface, wherein the bottom surface includes a plurality of channels (grooves 304), see Figs.3A-3F Each channel extends from the inner diameter surface to the outer diameter surface and having a curved section defining a rounded ceiling and substantially vertical side walls, wherein a distance between the sidewalls is constant from the bottom surface to the curved section and the sidewalls have a length that is greater than the depth of the curved section, see Fig. 3B –3F. See depictions of carrier heads in Figs. 1B and 1C.

Regarding claim 2: See Fig. 3B and [0062].

Regarding claim 3: Fig. 3Bepicts a semicircular cross-section has a diameter about equal to a width of the channel.

Regarding claims 4 and 5: See Fig. 3D-3F.

Regarding claims 7 , 8, and 18: Uniform depth as depicted in the Fig. 2A.

Regarding claim 13: The annular body comprises a wearable material see [0058].

Regarding claim 20: Chen et al teaches a method of polishing wherein there is relative motion between a substrate and a polishing surface, see [004] to [006] substituting the retaining rings having grooves through which polishing fluid is supplied as illustrated in Figs. 3B-3F.

Regarding claim 21: Section [0067] teaches a depth of 1-30 mm or 0.04 –1.2 in.

4. Claims 1-3, 7,8, 10-13, and 18-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Glashauser (US 6,419,567).

Regarding claims 1 and 19: Glashauser teaches a retaining ring (300) comprising: a generally annular body having a top surface, a bottom surface, an inner diameter surface, and an outer

diameter surface, wherein the bottom surface includes a plurality of channels (grooves 350), see Fig. 8F Each channel extends from the inner diameter surface to the outer diameter surface and having a curved section defining a rounded ceiling and substantially vertical side walls, wherein a distance between the sidewalls is constant from the bottom surface to the curved section and the sidewalls have a length that is greater than the depth of the curved section. See depictions of carrier heads in Fig. Fig.1A.

Regarding claim 2: See Fig. 8. and col. 6 lines 18-20.

Regarding claims 3 and 7: Fig. 8 depicts a semicircular cross-section has a diameter about equal to a width of the channel and have uniform depth.

Regarding claims 8 and 18: Uniform depth as depicted in the Fig.10.

Regarding claims 10-12: See 1A and 8 the difference in heights of the sidewalls creates a ledge.

Regarding claim 13: The annular body comprises a plastic or ceramic as recited in col. 5 lines 24-30. It is the examiner's position that the material of construction is wearable due to the movement of the ring along the substrate and the expressed to prevent damage to the wafer while pressing against the pad, see col. 3 liens 54-60.

Regarding claim 20: Glashauser teaches a method of polishing wherein there is relative motion between a substrate and a polishing surface, see col.3 substituting the retaining rings having grooves through which polishing fluid is supplied as illustrated in Figs. 1A and 8

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al or Glashauser.

The teachings of Chen et al or Glashauser were discussed above. Chen et al or Glashauser fail to teach the angle relative to the radial segment as recited in claim 8 is between 30 and 60 degrees.

Regarding claim 9: Chen et al or Glashauser fails to teach the retaining ring of claim 8, wherein the angle is between 30 and 60 degrees.

The angle of orientation of the plurality of channels affects the uniformity and efficiency of flow of the slurry and serves to optimize the reduction of the accumulation of dried slurry in the grooves and thus reduces the micro scratches. It would have been obvious to one having ordinary skill in the art to have determined the optimum value of cause effective variables such as the angle of orientation of the channels in the absence of a showing of criticality, see In re Woodruff, 16 USPQ 2d 1934, 1936 (Fed. Cir. 1990). Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide the recesses of Chen et al or Glashauser at an angle range of 30 to 60 degrees in order to accommodate the force caused by polishing.

7. Claims 10-12 and 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al in view of DeMeyer et al.

The teachings of Chen et al were discussed above.

Chen et al fails to teach that the retaining ring of claim 1 , wherein the outer diameter surface includes a ledge.

DeMeyer et al teaches a two retaining ring wherein the outer diameter surface includes a ledge, See Fig 1A. and [0023-0026]. The motivation to provide a ledge is that the design ensures a threaded edge surface and an enhanced assembly surface for the CMP apparatus. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide a ledge in the retaining ring of Kajiwara et al when modified by the teachings of DeMeyer et al.

Regarding clam 11: Chen et al fails to teach the retaining ring of claim 10, wherein the outer diameter surface includes a first portion adjacent the bottom surface that has an outer diameter less than a second portion adjacent the top surface.

This occurs due to the ledge of DeMeyer et al. The motivation to provide a ledge is that the design ensures a threaded edge surface and an enhanced assembly surface for the CMP apparatus. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide a ledge in the retaining ring of Chen et al when modified by the teachings of DeMeyer et al.

Regarding claim 12: Recall the retaining ring of Chen et al teaches that each channel includes substantially vertical side-walls. It would have been obvious to one having ordinary skill in the art to have determined the optimum value of cause effective variables such as the dimension of the ledge of DeMeyer et al in the absence of a showing of criticality, see In re Woodruff, 16 USPQ 2d 1934, 1936 (Fed. Cir. 1990). The motivation to design the side walls extend to substantially the same depth as the ledge is that the dimensions provide the optimal slurry

distribution. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to design the side walls of Chen et al to extend to substantially the same depth as the ledge (suggested by DeMeyer et al) is that the dimensions provide the optimal slurry distribution.

Regarding claim 14: Chen et al fails to teach the retaining ring of claim 1, wherein the annular body comprises an upper portion and a lower portion, the upper portion being more rigid than the lower portion. DeMeyer et al teaches a two-part retaining ring wherein the upper part is metal and the lower part is made of plastic. The motivation to modify the apparatus of Chen et al into a two piece construction is that the wearable plastic portion of the ring can be replaced without removing the top portion from the carrier head see [007] of DeMeyer et al. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to construct the retaining ring of Chen et al with an upper portion and a lower portion, the upper portion being more rigid than the lower portion as suggested by DeMeyer et al.

Regarding claim 15: The retaining ring of claim 14, recall the channels (grooves 304) of Chen et al are formed in the lower portion.

Regarding claim 16: Recall Chen et al teaches that the lower portion is formed of a wearable material. Note the lower portion of DeMeyer et al is a wearable plastic. DeMeyer et al teaches a two-part retaining ring wherein the upper part is metal and the lower part is made of plastic. The motivation to modify the apparatus of Chen et al into a two piece construction is that the wearable plastic portion of the ring can be replaced without removing the top portion from the carrier head see [007] of DeMeyer et al. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to construct the retaining ring of Chen et al

with an upper portion and a lower portion, the upper portion being more rigid than the lower portion as suggested by DeMeyer et al.

Regarding clam 17: The retaining ring of claim 15, further comprising a plurality of passages extending through the upper portion from the inner diameter surface to the outer diameter, see the channels of Chen et al.

8. Claims 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Glashauser in view of DeMeyer et al.

The teachings of Glashauser were discussed above.

Regarding claim 14: Glashauser fails to teach the retaining ring of claim 1, wherein the annular body comprises an upper portion and a lower portion, the upper portion being more rigid than the lower portion.

DeMeyer et al teaches a two-part retaining ring wherein the upper part is metal and the lower part is made of plastic. The motivation to modify the apparatus of Hiroshi into a two piece construction is that the wearable plastic portion of the ring can be replaced without removing the top portion from the carrier head see [007] of DeMeyer et al. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to construct the retaining ring of Hiroshi with an upper portion and a lower portion, the upper portion being more rigid than the lower portion as suggested by DeMeyer et al.

Regarding claim 15: The retaining ring of claim 14, recall the channels (grooves 350) of Glashauser are formed in the lower portion.

Regarding claim 16: Glashauser fails to teach the retaining ring of claim 15, wherein the lower portion is formed of a wearable material, only that the ring is made of plastic or ceramic in col.5

lines 24-28. Note the lower portion of DeMeyer et al is a wearable plastic. DeMeyer et al teaches a two-part retaining ring wherein the upper part is metal and the lower part is made of plastic. The motivation to modify the apparatus of Hiroshi into a two piece construction is that the wearable plastic portion of the ring can be replaced without removing the top portion from the carrier head see [007] of DeMeyer et al. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to construct the retaining ring of Hiroshi with an upper portion and a lower portion, the upper portion being more rigid than the lower portion as suggested by DeMeyer et al.

Regarding clam 17: The retaining ring of claim 15, further comprising a plurality of passages extending through the upper portion from the inner diameter surface to the outer diameter, see the channels of Glashauser, see Figs. 1A and 8.

9. Applicant's submission of an information disclosure statement under 37 CFR 1.97(c) with the fee set forth in 37 CFR 1.17(p) on 3/2/2007 prompted the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 609.04(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sylvia R. MacArthur whose telephone number is 571-272-1438. The examiner can normally be reached on M-Th during the hours of 8 a.m. and 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sylvia R MacArthur
Primary Examiner
Art Unit 1763

May 14, 2007